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ABSTRACT

A study determined the effectiveness of strategy instruction for children with reading problems. Subjects, 24 Dutch children in grades 4 to 6 from 2 schools for special education associated with a clinic for intensive child care, were divided into a control group and an experimental group. The experimental program consisted of 13-14 lessons, each taking about 30 to 40 minutes. Instruction in metacognitive and comprehension monitoring strategies was given to groups of three children outside the classroom during regular reading lessons. Children in the control group attended their normal program. Pretests and posttests were administered, as well as retention tests four weeks after the posttest. Results indicated that: (1) the children in the experimental group showed an increase in awareness of strategies for reading comprehension, an improvement that could still be observed four weeks after the training; (2) children who received the experimental instruction showed an increase in comprehension scores, scores that also remained higher four weeks after the instruction ended; and (3) although a trend in favor of the prior knowledge condition could be observed, it could not be confirmed in statistical analyses. Findings suggest that the increase in strategy knowledge had a positive and facilitating effect on the reading comprehension process. (Two figures of data are included.) (RS)

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Activating prior knowledge as a process-oriented strategy

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The objective of the present investigation was to examine the effectiveness of teaching strategies for reading comprehension. The goal of teaching students strategies is to make them more active readers, who flexibly regulate and control their reading process and their comprehension of a text. Until recently a number of studies have been done about this topic, and the findings have been very promising (Baumann et al., 1992; Palincsar & Brown, 1989; Paris et al., 1984). The specific purpose of this study is to determine the effect of strategy-instruction for children with reading problems.The question on which this paper concentrates is about the relative effectiveness of activating prior knowledge as a strategy. Assuming that beginning and poor readers not always have, or adequately use background knowledge, several intervention studies have focussed on the possibility of instructing (the use of) relevant prior knowledge (Alverman et al., 1985). Instruction is usually text-oriented: it focuses on understanding one specific text. Another goal of instruction can be to increase the *ability* to comprehend from text: it is pupil- or process-oriented Although 'text-oriented' intervention studies are numerous and have produced promising results, no transfer effects on the understanding of other texts have been proved. Instruction in which a process-oriented strategy is taught might have more transfer potential than a text-oriented instruction (Dole et al., 1991). Therefore, the present paper focuses on the effect of teaching a process-oriented strategy to develop children's ability to activate their own background knowledge. This strategy was integrated in a comprehensive strategy training, to allow for a valid and meaningful comparison between conditions. Two groups of children attended the strategy training, but in one of the groups no explicit instruction was given in prior knowledge activation.

Method

Procedure. A pretest-posttest control group design was followed. Moreover, retention tests were administered four weeks after the posttest. Instruction was given during approximately seven weeks and the period between pre- and posttest therefore was about two months. Tests were administered individually or in small groups, and were all scored by the experimenter. The experimental program consisted of 13-14 lessons, each taking about 30 to 40 minutes. Lessons were attended by groups of three children (four groups). Instruction was given outside the classroom by the experimenter, mostly during regular reading lessons. Children in the control group attended their normal program. Within the experimental group, two conditions were distinguished. In the first condition, children attended strategy training comprising prior knowledge activation as an extra strategy. Children in the second condition did not receive this extra strategy. The other parts of the program, however, were identical for both conditions.

Subjects. Subjects were 24 Dutch children (18 boys, 6 girls) from two schools for special education associated with a clinic for intensive child care. They were selected according to the following criteria: age between 10-12 years (educational grades 4-6); scores on a standardized reading comprehension test lower than the mean score of a one-year younger norm group; minimal decoding skills at the level of grade 3; and minimal verbal IQ of 80. Twelve pupils were selected as a control group, attending regular reading lessons while twelve others received the experimental program, equally divided over the two conditions. There were no significant differences between control and experimental group with regard to variables such as age, verbal IQ, vocabulary and decoding. Also, no differences were found on these variables between the subjects in the two experimental conditions.

Instruments. To determine declarative knowledge of strategies for reading comprehension, an experimental *questionnaire* was developed. It contains 15 statements, which describe 12 relevant and 3 irrelevant strategies which can be used before, during and after reading. An example of one item in the questionnaire is: "Before I start reading, I first think about what I already know about the subject". The items are of dichotomous agree-disagree level, and maximum score is 12. The coefficient for item-consistency (KR20) is .72 (Walraven & Reitsma, 1991).

Performance in reading comprehension was determined by a standardized Dutch *Cloze-test* (Aarnoutse & Buitenhuis, 1984). The test consists of one text of approximately 400 words,with 50 blanks (each 7th word). Time-limit is 35 minutes. Mean score for normal readers in grade four is 34, and maximum score is 50. Tests administered on the pre-, post- and retention measurement were respectively the A-, B- and A-form. Reported coefficients for itemconsistency (KR20) are .86 for the A-form and .85 for the B-form. Correlation between parallelversions is .75
Moreover, a standardized Dutch test for getting the *Main-idea* was administered (Aarnoutse, 1984). This test, also with parallel-versions, consists of 29 short texts of which the main idea has to be chosen from four alternatives. Time limit is 70 minutes. Mean score for normal fourth-grade readers is 19, and the maximum score is 29. Tests administered on the pre- and post-measurement were respectively the A- and B-form. Reported coefficients for itemconsistency (KR20), are .89 for the A-form and .90 for the B-form. Correlation between parallelversions is .75. Because of time constraints, this test was not used at the retention measurement.

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Program. On basis of other studies in which metacognitive and comprehension monitoring behaviors were trained, a set of strategies was selected (Palincsar & Brown, 1989). The third strategy, 'activating background knowledge', is only taught in the first experimental condition. By means of the question "What do I know already about the subject", pupils were stimulated to activate their prior knowledge before reading the text. By modeling the strategy, the teacher emphasized that only relevant background knowledge should be used, because poor readers tend to use whatever comes to mind (McCormick, 1992). All strategies were introduced step by step and were described in concrete questions for the pupils. These questions were also presented on a series of 'help-cards', visually supported by means of illustrations. Each new card contained the strategies already attended to before, and was extended by the strategy which was introduced

and discussed during the particular phase of the instruction. All strategies were practised while reading expository texts, which were all age-appropriate and challenging for the subjects participating in this study.

Strategy	Pupil's questions
Determining purpose for reading	Why am I going to read?
Making predictions about the content	What is the text probably about?
Activating background knowledge	*What do I know already about the subject?*
Flexible control of comprehension	Stop! Is this clear to me?
Selecting important ideas	What is important to note?
Summarizing and evaluation	What did I learn from this text?

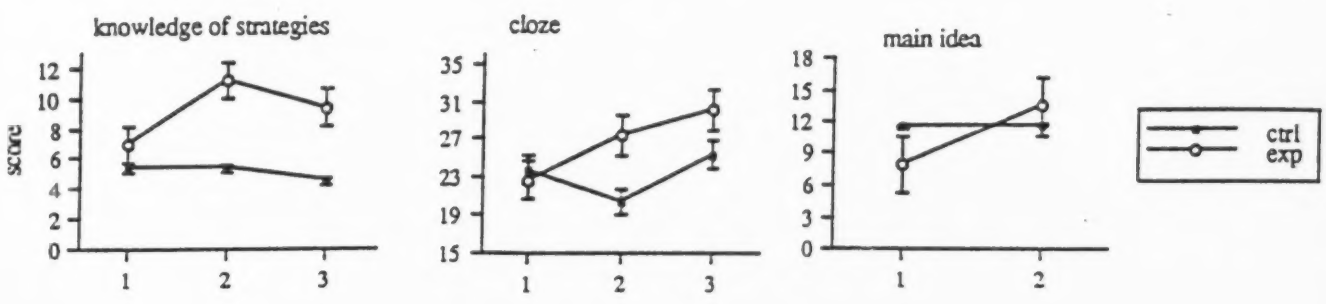
The lessons were given according to principles of direct and explicit instruction. It comprised the following phases: (1) repeating relevant knowledge from previous lessons; (2) explaining the aim of the new lesson; (3) modelling the use of a strategy; (4) guided practice; (5) independent practice; and (6) paraphrasing the new information of the lesson.

During the phase of independent and guided practice the procedure of reciprocal teaching was followed, by encouraging pupils to assume the role of the teacher (Palincsar & Brown, 1989). With reciprocal teaching, children and teacher take turns leading the dialogue about the text and its meaning, breaking the text into segments while applying the strategies. Responsibility for the comprehension process is shifting from the teacher towards the pupils, making them more active and self-regulating readers.

Results

Children who attended the experimental program were all very motivated. Although initially they did not like reading at all, because their long history of failing, this approach was very stimulating to them. Finally they were able to learn how to cope with a text and how to improve their comprehension process. Reciprocal teaching proved to be a very useful instructional approach. Children participated actively and helped and corrected each other. Because instruction in strategies was rather unfamiliar to them, it took some time before they were used to think aloud, to assume the teachers' role and to reflect on their own reading process.

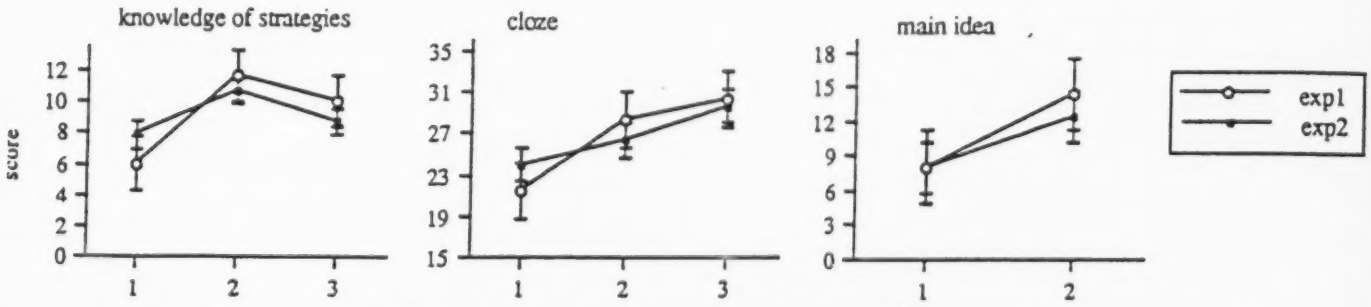
In the following figure the results on the pre(1), post(2) and retention tests(3) are presented for the control and experimental group.



It is clearly shown that children in the experimental group increase their knowledge of strategies and improve their performances on reading comprehension tests. These increases can not be observed in the control group. The observed trends were verified in statistical analyses. First, the differences between the control and experimental group were examined. ANOVA's on the pretest scores revealed no significant differences between groups. A MANOVA with repeated measures was done on the results of the pre- and posttests. The analysis revealed a significant interaction-effect between group and repeated measures, according to Wilks' Lambda, $F(3, 20)=12.9$, $p<.001$. Examination of the univariate analyses of variance with repeated measures revealed significant interaction effects for all three dependent variables. Respectively for the questionnaire, $F(1,22)=19.5$, $p<.001$; the cloze-test, $F(1,22)=21.2$, $p<.001$; and the main idea-test, $F(1,22)=6.7$, $p<.05$. Also, the proportion of variance which was due to the treatment effect was determined. Estimated treatment effects on the questionnaire, the cloze-test and the main idea test were respectively, $\omega=.43$, $\omega=.37$ and $\omega=.12$.

Longer-term effects were also examined with a MANOVA on the results of the pre-, post- and retention measurement of two dependent variables. This analysis again revealed a significant interaction-effect between group and repeated measures, Wilks' Lambda $F(4,86)=7.8$, $p<.001$. Examination of the univariate analyses of variance with repeated measures showed significant interaction effects for both dependent variables, respectively for the questionnaire, $F(2, 22)=14.0$, $p<.001$; and the cloze-test, $F(2,22)=8.1$, $p<.01$. Also, the proportion of variance which was due to the treatment effect was determined. Estimated treatment effects on the questionnaire and the main idea test were respectively, $\omega=.37$ and $\omega=.12$.

In the following figure the results on the pre(1), post(2) and retention tests(3) are presented for the two experimental conditions.



For both experimental conditions an increase can be observed in strategy knowledge, although there seems to be a trend in favor of the first 'prior knowledge' condition. This trend can also be observed for the reading comprehension tests. But could these trends be confirmed in statistical analyses? First, the differences between the two experimental conditions were examined. ANOVA's on the pretestscores did not reveal significant differences between groups. A MANOVA with repeated measures was done on the results of the pre- and posttests, and it also revealed no significant interaction-effect between group and repeated measures, Wilks' Lambda $F(3, 8)=2.6$, $p=.12$. Moreover, longer-term effects were examined with a MANOVA on pre-, post- and retention measures for two dependent variables. Again, no significant interaction-effect was apparent between group and repeated measures, Wilks' Lambda $F(4, 38)=2.3$, $p=.08$. Examination of the univariate analyses of variance with repeated measures showed a significant interaction-effect for the questionnaire, $F(2,10)=4.7$, $p<.05$. Estimated treatment effect on the questionnaire was $\omega=.43$.

Discussion

The findings clearly indicate that the training of strategies has been very fruitful for these poor readers. The children who received the experimental program showed an increase in awareness of strategies for reading comprehension. This improvement could still be observed four weeks after the training. Of course, improvement in strategy knowledge was not a final goal. The main question was whether the instruction in strategies has a positive effect on performances on reading comprehension tasks. The findings obviously indicate that children who received the experimental instruction showed an increase in scores on tests for reading comprehension. Also four weeks after the intervention, this higher level of comprehension scores could still be observed. It can be suggested that the increase in strategy knowledge has had a positive and facilitating effect on the reading comprehension process.

The main question in this paper addressed the possible surplus-effect of prior knowledge activation. However, the results did not reveal clear evidence. Although a trend in favor of the prior knowledge condition could be observed, it could not be confirmed in statistical analyses. Of course, only a small group of children participated in this study and interindividual differences were relatively large in comparison to systematic effects of the experimental conditions. Moreover, the tests used as dependent variables did not ask explicitly for prior knowledge activation, or only indirect and incidental. Therefore a large effect on these measures could not be expected (e.g. Paris et al., (1984) about the problems with standardized tests in instructional intervention studies). On the other hand, it could be possible that for these poor readers, aged ten to twelve, prior knowledge activation on their own is not attainable. Probably, activating what they already know, might even divert their attention from the content (McCormick, 1992). Also, activation of wrong prior knowledge might rather interfere with comprehension (Alverman et al., 1985).

Finally, it can be argued that the power of the contrast between the two conditions was not strong enough. For example, prior knowledge was not only tapped by the manipulated strategy. In fact, the second strategy: making predictions about the content also heavily draws on using prior knowledge. By means of the title, pictures, key words and topic sentences in a text, children also make use of their background knowledge, of course more limited by the structure of the text. In the present design, the predicting-strategy was taught to both conditions. Probably, the isolation of a combination of the second and third strategy, could have provided more contrast-potential.

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